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NOTES ON MAMMALS FROM THE NILE DELTA REGION OF EGYPT

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FROM JULY 12, 1946, to April 9, 1947, Ens. P. Quentin Tomich collected mammals from the Nile Delta while serving with Naval Medical Research Unit No. 3. In addition to the large collection made by Ensign Tomich, Lt. S. M. Wheeler, of the United States Typhus Commission, obtained some specimens in the Cairo area. Earlier, in 1924, Miss Annie M. Alexander obtained a small collection from the Cairo area and from the Fayum. The former two collections are on deposit in the United States National Museum while the latter is on deposit at the Museum of Vertebrate Zoology of the University of California (MVZ) and has been made available for study at this time by Dr. Alden H. Miller.

Since impetus is being given study of the role wild mammals play in diseases of man, a brief diagnosis of the external characters plus comments on taxonomic problems as relating to the commoner mammals from Egypt, as based on the above-mentioned material, will be useful to epidemiologists working in the Nile Delta region.

It will be noted that in certain cases names have been validated from Etienne Geoffroy St.-Hilaire, 1803. The "Catalogue des Mammifères du Muséum National d'Histoire Naturelle" meets all requirements for Linnaean names as established by the International Commission on Zoological Nomenclature. In all instances the descriptions are clearly recognizable. It is believed that the statement of Isidore Geoffroy St.-Hilaire, to the effect that his father never intended the above work for a scientific treatise, should not be accepted, inasmuch as the work is clear, concise, and was published and circulated.

The Tomich collection is perhaps the largest and most complete single collection known from the Nile Delta region. Even so, several species that have occurred and presumably still occur in that region were not taken by the collectors on whose work this paper is based. For the sake of completeness, references to these have been extracted from the literature.

In addition there are four species which have been taken from the Delta region within historic time but have since been extirpated. They are: Wild sheep, *Ammotragus lervia*; dorcas gazelle, *Gazella dorcas*; saberhorned oryx, *Oryx algazel*; and addax, *Addax nasomaculata*.

Capitalized color terms are from Ridgway, "Color Standards and Color Nomenclature" (1912). All measurements are given in millimeters and all weights in grams.

No comments have been made in regard to habitats or habitat preference, since Tomich hopes to publish an account of the natural history of these animals and their role in epidemiology.

Order INSECTIVORA

Family ERINACEIDAE

HEMIECHINUS AEGYPTIUS (E. Geoffroy St.-Hilaire)

Erinaceus aegyptius E. GEOFFROY ST.-HILAIRE, Catalogue des mammifères du Muséum National d'Histoire Naturelle, p. 69, 1803 (Egypt).

Erinaceus libycus HEMPRICH and EHRENBURG, Symbolae physicae . . . , dec. 2, footnote, folio k, 1832 (near Alexandria, Egypt).

Specimen examined.—One. Giza Province: Abu Rauwash, Cairo area (MVZ).

Description.—Upper parts, except head and shoulders, covered with short (15 to 20 mm.) spines; base of spines (3 to 5 mm.) brownish, then a buffy band, a brown and a terminal white band of about equal width; hairs of entire head, ears, belly, fore and hind legs Warm Buff. Tail short; ears large; eyes small; fore feet broad and short; hind feet relatively long and narrow.

Measurements.—An adult male from Abu Rauwash, Cairo area, measured: Total length 200; length of tail 20; length of hind foot 35; condylobasal length 45.8; length of palate 24.2; width of rostrum at lacrimal canal 10.4; length of nasals 17.0; least interorbital width 11.0; width across zygomatic arches 26.4.

Remarks.—No ear measurements are available for the one specimen examined, but from the appearance of the dry skin the ears appear as though they would, when laid forward in a fresh specimen, reach to the end of the nose.

Family SORICIDAE

CROCIDURA OLIVIERI (Lesson)

Sorex olivieri LESSON, Manuel de mammalogie . . . , p. 121, 1827 (Saqqara Pyramids, Giza Province, Egypt, as a mummy).

Specimen examined.—One. Giza Province: Talbia.

Description.—Entire upper parts Prout's Brown, shading rather rapidly on the lower sides to dark gray, which covers the entire ventral surface with the exception of a small patch of brownish hairs on the throat; tail of uniform color around and finely covered with long whitish hairs; dorsal surfaces of hands and feet grayish, shading to white on the digits; palms and soles naked. Ears large, nearly naked and with a pronounced fold on the ventral surface; tail more than half the length of head and body. Scent gland, lying immediately anterior to flank and between the dark dorsal and light ventral colors, conspicuous and covered with short whitish hairs.

Measurements.—No external measurements were available but the skull of an adult male from Talbia, Giza Province, measured: Greatest length 29.0; occipitonasal length 26.4; greatest width of braincase 12.5; least interorbital width 5.5; length of palate 12.0; width across M² 9.3; length of tooth row (incisor to M³) 12.8; width of rostrum 3.6.

CROCIDURA FLOWERI Dollman

This species is known from Giza and Belim. It is apparently rare and hard to obtain. It differs from *Crocidura olivieri* in smaller size (head and body 57–71 mm. as opposed to 93–110 mm. in *C. olivieri*). No specimens have been examined.

CROCIDURA RELIGIOSA I. Geoffroy St.-Hilaire

This is the smallest *Crocidura* to be found in the Nile Delta. It apparently is fairly common in the Giza Gardens and in the country near Abu Rauwash. The head and body range from 45 to 55 mm. in length, thus separating this species from the other, larger, species of *Crocidura* known to occur in the same general area. No specimens have been examined.

SUNCUS CRASSICAUDUS Lichtenstein

Despite efforts of several collectors to retake this species in Suez and Suakin, Sudan, it has not been found. It is thought that it is probably the same animal as the *Suncus* found along the coastal region of India and that the individuals known from North Africa are merely fortuitous travelers come ashore from some trading vessel. It may be distinguished, if ever retaken, from specimens of the

larger species of *Crocidura* by the presence of two more teeth in the jaws (total of 28 in *Crocidura* and 30 in *Suncus*). No specimens have been examined.

Order CHIROPTERA

Family PTEROPIDAE

ROUSETTUS EGYPTIACUS (E. Geoffroy St.-Hilaire)

Pteropus egyptiacus E. GEOFFROY ST.-HILAIRE, Ann. Mus. Nat. Hist. Natur. Paris, vol. 15, p. 96, 1810; spelling of specific name corrected or emended to *aegyptiacus* in Description de l'Égypte. Histoire naturelle, . . . mammifères . . ., vol. 2, p. 134, pl. 3, fig. 2, 1818 (Great Pyramid of Giza).

Specimens examined.—Seven. Giza Province: Gezira Island, Cairo.

Description.—Upper parts between Drab and Hair Brown, shading to between Light Drab and Drab on the underparts; all hairs uniform in color to base; membranes of wings and uropatagium, in dry specimens, blackish; feet, uropatagium and forearm for half its length, sparsely furred; uropatagium reduced to a semicircular membrane, extending but slightly beyond the rump; tail short, barely exceeding the narrow rim of the uropatagium; hind feet large, strongly clawed; thumb long; index finger with small claw; toes of hind feet with short bristlelike hairs; ears large, somewhat pointed; tragus absent.

Measurements.—Averages and extremes of two males and five females from Gezira Island, Cairo, were, respectively: Total length 152 (148–154), 145.4 (134–162); length of tail 14 (13–15), 13.4 (12–14); length of forearm 91.5 (88–95), 87.8 (85–95); length of hind foot 27.5 (26–29), 27.5 (27–28); length of ear from notch 23 (23), 22.2 (22–23); greatest length of skull 42.7 (41.8–43.6), 40.96 (39.2–42.8); basal length 41.1 (40.2–41.9), 39.2 (37.2–41.5); occipitonasal length 41.0 (40.0–42.0), 39.2 (37.3–41.2); greatest zygomatic breadth 25.85 (24.6–27.1), 24.4 (22.8–26.2); breadth of braincase 16.75 (16.5–17.0), 16.7 (16.3–17.1); canine to M³ 16.8 (16.4–17.2), 16.1 (15.4–16.9); weight of two females 125.0 (109–141).

Remarks.—Anderson (1902) regards *Vespertilio aegyptiacus* Linnaeus, in Hasselquist, 1757, as being the first name to be applied to these bats. This is erroneous since the description in 1757 is not tenable but does state that *V. aegyptiacus* has a tragus, that it is of small domestic mouse size and that the tail is the same length as the body. The name, if it were tenable, would have to be used for *Rhinopoma microphyllum*.

Family RHINOPOMATIDAE

RHINOPOMA MICROPHYLLUM (Brunnich)

Vespertilio microphyllus BRUNNICH, Dyrenes historie og dyre-samlingen udi universitetets natur-theater, vol. 1, p. 50, pl. 6, figs. 1-4, 1782 (Arabia and Egypt).

Specimens examined.—Twelve. Giza Province: Cairo area, Saqqara Pyramids, 11; Pyramids of Giza, 1.

Description.—Upper parts Mouse Gray shading to whitish below; membranes of wing brownish; ears light brownish, nearly naked; face but sparsely covered with fine grayish hairs; tragus free of pinna and spatulate. Tail as long as or longer than head and body, three-fourths of which is completely free of the uropatagium; ears joined by a ridge across the forehead; hind legs long.

Measurements.—Averages and extremes of seven males and four females from Saqqara Pyramids, Cairo area, were, respectively: Total length 139 (127-145), 141 (139-143); length of tail, 59.8 (54-67), 60.5 (58-63); length of forearm 68.4 (66-71), 68 (67-69); length of hind foot 16.5 (16-17), 16.2 (16-17); length of ear from notch 20.2 (19-22), 20.2 (19-21); greatest length of skull 20.6 (20.2-21.3), 20.2 (19.8-20.3); condylobasal length 18.6 (17.7-19.5), 18.1 (17.8-18.4); occipitonasal length 17.6 (16.9-18.4), 17.2 (16.7-17.3); greatest zygomatic width 12.1 (11.5-12.6), 11.95 (11.8-12.1); width of braincase 8.5 (8.2-8.8), 8.5 (8.4-8.6); canine to M³ 7.7 (7.3-8.0), 7.5 (7.4-7.6); weight 19 (14-25), 17.5 (17-19).

Remarks.—As may be noted from the measurements, there is a considerable amount of variation in size of these bats. On the basis of size, Thomas described *Rhinopoma cystops* from Luxor, Egypt.

This species may be distinguished from the smaller *R. cystops* by the longer forearm, darker coloration, and larger skull in all measurements taken.

RHINOPOMA CYSTOPS Thomas

Rhinopoma cystops THOMAS, Ann. Mag. Nat. Hist., ser. 7, vol. 11, p. 496, May 1903 (Luxor, Egypt. Type: Adult female, B. M. No. 2.1.17.2).

Specimens examined.—Sixteen. Giza Province: 8 miles southwest of Cairo, at the Pyramids, 12; Pyramids of Giza, 4.

Description.—Upper parts Light Mouse Gray shading to whitish below; membranes of wing brownish; ears light brownish, nearly naked; face but sparsely covered with fine grayish hairs; tragus free of pinna and spatulate. Tail as long as or longer than head and body, three-fourths of which is completely free of the uropatagium; ears joined by a narrow ridge across the forehead; hind legs long.

Measurements.—Averages and extremes of nine males and three females from 8 miles southwest of Cairo, at the Pyramids, were, respectively: Total length 135 (128–143), 131 (125–138); length of tail 68.0 (64.0–73.0), 65.0 (61.0–70.0); length of forearm 57.5 (55.0–60.0), 55.3 (53.0–57.0); length of hind foot 13.3 (13.0–14.0), 13.3 (13.0–14.0); length of ear from notch 19.0 (18.0–20.0), 19.3 (18.0–21.0); greatest length of skull 18.1 (17.9–18.4), 17.6 (17.2–17.9); condylobasal length 16.1 (15.9–16.2), 15.6 (15.5–15.7); occipitonasal length 14.9 (14.7–15.1), 14.4 (14.2–14.6); greatest zygomatic width 10.4 (10.2–10.7), 10.36 (10.3–10.4); width of braincase 7.6 (7.4–7.7), 7.3 (7.3); canine to M³ 6.3 (6.2–6.4), 6.0 (5.9–6.1).

Remarks.—The specimens listed above vary in some detail from the measurements given by Thomas in his description of the species. These measurements of the Cairo specimens are all somewhat larger but are definitely smaller than those given for the larger species *Rhinopoma microphyllum*. Thanks to C. C. Sanborn, curator of mammals, Chicago Natural History Museum, measurements of specimens of *R. cystops* from various localities throughout the Middle East have been made available to me. A topotypical series of 17 specimens of *R. cystops* are only slightly smaller than the measurements given for the Cairo series above. It is apparent that Flower (1932, p. 385) was in actuality comparing specimens of *R. cystops* from the type locality and from the Cairo area. He thus arrived at the conclusion that *R. cystops* was conspecific with *R. microphyllum*. That this conspecificity is not real is shown by a comparison of the measurements listed for the two species in the present paper.

The two species were found together, by Tomich, at the Pyramids of Giza. Among these specimens the larger, darker *R. microphyllum* is easily differentiated.

Family EMBALLONURIDAE

TAPHOZOUS PERFORATUS E. Geoffroy St.-Hilaire

Taphozous perforatus E. GEOFFROY St.-Hilaire, Description de l'Égypte. Histoire naturelle, . . . mammifères . . ., vol. 2, p. 126, 1818 (Egypt).

Specimens examined.—Fifteen. Giza Province: north base of Mount Abu Rauwash.

Description.—Upper parts Hair Brown shading to Drab on the belly and throat; all hairs white at base; face and chin but sparsely haired; wing membranes and uropatagium brownish; radio-ulna lightly furred for one-fourth its length with whitish hairs; tail, for about half its length, free of uropatagium and tipped with a few grayish hairs; ears small and haired at base, rest naked; tragus free

from pinna, small and papillate in shape; calcar about three-fourths the length of the tibio-fibula.

Measurements.—Averages and extremes of six males and nine females from the north base of Mt. Abu Rauwash were, respectively: Total length 101 (99–102), 102.3 (101–106); length of tail 22.6 (22–23), 23.4 (22–26); length of forearm 64 (63–65), 64 (63–66); length of hind foot 14 (14), 13.6 (13–15); length of ear from notch 17.3 (17–18), 17.5 (17–18); greatest length of skull 20.3 (20.1–20.6), 20.1 (19.8–20.3); basal length 19.4 (19.0–19.6), 19.2 (18.8–19.6); occipitonasal length 17.3 (17.2–17.3), 17.1 (16.9–17.4); greatest zygomatic breadth 11.7 (11.6–11.8), 11.6 (11.4–11.7); breadth of braincase 9.5 (9.3–9.7), 9.35 (9.0–9.5); canine to M³ 8.5 (8.5), 8.5 (8.4–8.6); weight 24.0 (20–27), 24.2 (16–28).

Remarks.—From the other bats available at this time from the Cairo area, this species may be distinguished by its rather long, pointed ears, the peculiar tuft of hair on the rather short, free tail, by the white basal portion of the hairs, and by the long calcar which supports the posterior edge of the uropatagium.

LIPONYCTERIS NUDIVENTRIS (Cretzschmar)

Taphozous nudiventris CRETZSCHMAR, in Rüppell, Atlas zu der Reise im nördlichen Afrika, p. 70, pl. 27b, 1828 (Egypt).

Specimens examined.—Five. Giza Province: Abu Rauwash (MVZ).

Description.—Upper parts Hair Brown shading into Cinnamon-Drab on the lower parts; wings, uropatagium, feet and ears, blackish; muzzle, chin, rump, under surfaces of femora, uropatagium, ears and wing membranes, naked, with the exception of a narrow strip of whitish hairs running the entire length of the membrane on the under-side of the forearm. Tragus large and truncate; tail about one-fourth of total length, free from uropatagium for about one-half its length, sparsely covered with long whitish hairs.

Measurements.—Averages and extremes of three males from Abu Rauwash were: Total length 124 (121–126); length of tail 30 (28–32); length of hind foot 18 (18); greatest length of skull 28.2 (26.8–29.6); basal length 21.6 (21.4–21.8); occipitonasal length 24.4 (24.0–24.8); greatest zygomatic breadth 16.2 (15.8–16.7); breadth of braincase 11.2 (11.0–11.3); length of tooth row from M³ to canine 11.3 (11.0–11.5).

Remarks.—This bat may be told from a close relative living in the same area, *Taphozous perforatus*, by the bare rump, the bare under-side of the femora and the much larger skull.

It is interesting that in 1924 Miss Alexander obtained only *Liponycteris nudiventris* at Abu Rauwash and in 1946 Tomich obtained only the closely allied *Taphozous perforatus*.

Family RHINOLOPHIDAE

RHINOLOPHUS ACROTIS Heuglin

Rhinolophus acrotis HEUGLIN, Nov. Act. Acad. Caesareae Leopoldino Carolinae, Halle, vol. 29, pp. 4, 10, December 1861 (Keren, Eritrea, about lat. 15°45' N., long. 38°30' E. Type: Adult male, labeled No. 986, Stuttgart Museum).

Specimens examined.—Four. Giza Province: Pyramids of Giza.

Description.—Upper parts Drab, underparts and base of hairs of upper parts Pale Drab-Gray; membranes of wing and uropatagium blackish brown; ears moderately large, rather acutely pointed, naked except at base and basal half of medial margin, tragus but a small rounded projection; noseleaf large, horseshoe shaped, dorsal projection free and rather small; face and muzzle fully haired; wings and uropatagium naked; tail, enclosed in uropatagium for its entire length, about half the length of the head and body.

Measurements.—Average and extremes of three males from the Pyramids of Giza were: Total length 85.0 (84–87); length of tail 28 (24–33); length of forearm 45.6 (45–47); length of hind foot 10.3 (9–11); length of ear from notch 19.3 (19–20); greatest length of skull 19.6 (19.5–19.7); basal length 15.6 (15.4–15.8); occipitonasal length 14.23 (14.2–14.3); zygomatic breadth 9.7 (9.6–9.8); breadth of braincase 8.7 (8.5–8.9); canine to M³ 7.0 (7.0); weight of two individuals 8.0 (8.0).

Remarks.—The two species of *Rhinolophus* supposedly occurring in the Cairo area are represented here by only *Rhinolophus acrotis*. This species is apparently much the same in size and dorsal coloration as *Rhinolophus euryale*. The two species can be distinguished by the light belly and rounded dorsal projection of the basioccipital in *R. acrotis* and the dark belly and pointed basioccipital in *R. euryale*.

Family HIPPOSIDERIDAE

ASELLIA TRIDENS (E. Geoffroy St.-Hilaire)

Rhinolophus tridens E. GEOFFROY ST. HILAIRE, Ann. Mus. Nat. Hist. Natur., Paris, vol. 20, p. 265, 1813 (Egypt).

Specimens examined.—Fifty. Lisht, Upper Egypt, 32 (alcoholic). El Maabdeh Cave, 1 (alcoholic). Oasis of Kharga, 12 (alcoholic). Henneh, 1. Nile, 4 (alcoholic).

Description.—Since only one conventional skin and skull combination is available, and that old and faded, an exact color diagnosis is not possible. Based on the one specimen, the color appears to have been light brown above and paler below; wing membranes and uropatagium dark brown. Nose with prominent "horseshoe" with trilobed leaf on dorsal surface; ears large, connected by narrow band

across top of head; no tragus appears on either dry or alcoholic specimens; tail for three-fourths of its length enclosed in uropatagium, other one-fourth free.

Measurements.—No skin measurements were available, but average and extreme skull measurements from five females from Lisht, Upper Egypt, were: Greatest length 18.0 (17.8–18.2); basal length 16.1 (15.6–16.6); occipitonasal length 14.3 (13.6–14.5); zygomatic breadth 10.0 (9.9–10.1); width of braincase 8.35 (8.3–8.5); canine to M³ 6.5 (6.5).

Remarks.—Presumably this bat is not to be found in the lower Nile region, since all records thus far have come from no farther north than Saqqara, Giza Province.

Family VESPERTILIONIDAE

PIPISTRELLUS KUHLLI (Natterer)

Vespertilio kuhlii NATTERER, in Kuhl, Die Deutschen Fledermäuse. Ann. Wetterau. Gesel. Hanau, vol. 4, p. 199, 1817 (Trieste).

Specimens examined.—Seven. Giza Province: 5 miles west of Simbillawein, 6; Maadi, 1.

Description.—Hairs of upper parts tipped with Buffy Brown, black at bases; underparts lighter than back; wing membranes, in dry specimens, dark brown, uropatagium lighter and strongly veined; posterior margins of wings and uropatagium bordered with white; ears small, brownish and naked; tragus large; base of uropatagium furred; calcar keeled.

Measurements.—Averages and extremes of five females from 5 miles west of Simbillawein and measurements of one male from the same locality are respectively: Total length, 87.2 (84–92), 89; length of tail 35.8 (32–37), 37; length of forearm 35.5 (35–36), 35; length of hind foot 8.5 (8–9), 8; length of ear from notch 12 (12), 12; greatest length of skull, 13.4 (13.2–13.6), 13.4; basal length 12.9 (12.7–13.2), 13.0; occipitonasal length 11.2 (11.1–11.3), 11.2; zygomatic breadth 8.4 (8.3–8.6), 8.5; breadth of braincase 6.6 (6.5–6.7), 6.6; canine to M³ 4.9 (4.9), 4.9; weight 4.25 (4.0–5.0), 5.0.

Remarks.—The series of bats available for study are remarkably uniform in color, in the whitish margins of the wings and uropatagia, as well as in the measurements of the skull. In one character of the skull, however, there is some variation that is rather peculiar. The first premolar on one side of the upper jaw is missing in two specimens. The tooth is extremely reduced in size in any event and even under high magnification no alveolus can be ascertained where the tooth is supposed to be in those specimens where the tooth is missing.

These two specimens present a condition that appears to tend toward the reduced dentition of *Scotozous*.

EPTESICUS INNESI Lataste

To date, there are two specimens of this bat known. They are the pair, on which the original description was based, taken by Dr. Walter Innes from a house in Cairo about 1885. Since that time no additional specimens have been recorded anywhere else in Egypt, although sought after. This bat may be distinguished from *Pipistrellus kuhlii* by the nearly naked face and the lack of white edging on the wings and uropatagium. No specimens have been examined.

PLECOTUS AURITUS Linnaeus

This bat may be distinguished from other species of bats occurring in the Nile Delta region by means of its large ears. The ears are almost as long as the head and body (head and body 45 mm., ear 35 mm.). It has been recorded from Mena House, Second Pyramid, and Minia. No specimens have been examined.

Family MOLOSSIDAE

NYCTINOMUS TENIOTIS (Rafinesque)

Cephalotes teniotis RAFINESQUE, *Precis des découvertes . . . somiologiques. . .*, p. 12, 1814 (Sicily).

Specimen examined.—One. Giza Province: near Cairo (alcoholic).

Remarks.—There was available to me only one specimen, preserved in alcohol. Any color diagnosis would, therefore, be worthless. The ears are large and narrowly joined across the forehead. Approximately half the tail is free of the uropatagium. *Nyctinomus teniotis* is considerably larger than *Nyctinomus aegyptiacus*, at least as far as the skull is concerned, from the specimens available. In addition, *N. aegyptiacus* has but two lower incisors on each side of the lower jaw, while *N. teniotis* has three.

It appears that there has been a great deal of doubt as to the names applied and as to what the respective authors were describing. Geoffroy St.-Hilaire (1818, p. 129), in describing *N. aegyptiacus*, says in regard to the teeth, "Les dents deviennent un excellent indicateur de cette organisation; les incisives sont au nombre de deux en haut, et de quatre en bas: celles-la sont fortes, coniques et contigues, quand les secondes sont tres-petites et comme entassees au devant des canines." It thus appears that the plate and the published description are at variance, since he states in the latter that there are four incisors below and the plate appears to show six. Is it possible that the artist interpreted the cingulum of the canine as an incisor? In De Winton's review of *Nyctinomus* he states there are four incisors in *N. aegyptiacus* and six in *N. teniotis*, yet he raises a question as to what *N. aegyptiacus* actually is in the published work of Anderson on the mammals of Egypt.

From specimens of identified *N. aegyptiacus* from Basutoland, *N. teniotis* is at once distinguished by its larger size and the occurrence of three instead of two incisors in each mandible.

Order LAGOMORPHA

Family LEPORIDAE

LEPUS AEGYPTIUS Desmarest

This is the largest of the hares to be found in Egypt. It has long, thin hind legs; the hind feet are long and narrow; the ears are about $1\frac{3}{4}$ times the length of the head; and the tail is black bordered with brown. It is known to occur in Giza and Fayum Provinces. No specimens have been examined.

LEPUS ROTHSCILDI De Winton

A medium-sized hare, characterized by short, stout hind legs; broad, short hind feet; ears about $1\frac{1}{2}$ times the length of the head; and the tail black, edged with white. On these characters it can be distinguished from *L. aegyptius*. It also is known to occur in Giza and Fayum Provinces.

Order RODENTIA

Family CRICETIDAE

GERBILLUS GERBILLUS ANDERSONI De Winton

Gerbillus andersoni DE WINTON, Ann. Mag. Nat. Hist., ser. 7, vol. 9, p. 45-46 [p. 45], January 1902 (Mandara, east of Alexandria, B.M. No. 92.7.1.5).

Specimens examined.—Eight. Behera Province: one-half mile west of Dikheila Airfield, 4; one-half mile east of Muntazah, 4.

Description.—Upper parts between Ochraceous-Buff and Ochraceous Orange; hairs plumbeous at base with a subterminal band of the above color and a terminal band, very minute, of black. Black hairs freely intermixed with banded hairs, thus presenting a somewhat subdued hue. Color purest on sides, flanks, cheeks, rump, and nose. Entire underparts, muzzle, most of the vibrissae, hind and forelegs, dorsal and ventral surfaces of hands and feet, supraorbital and postauricular spots, white. Tail penicillate, ochraceous above shading to yellowish white beneath; tip on dorsal surface with longish brown hairs. Ears blackish, sparsely covered with fine white hairs inside and ochraceous on the outside. Eye bordered by narrow black ring.

Measurements.—Averages and extremes of two males and two females from one-half mile east of Muntazah were, respectively: Total length 222 (219–224), 215 (207–223); length of tail 122 (120–125), 119 (113–125); length of hind foot 30 (30), 28 (27–29); length of ear from notch 15.5 (15–16), 15.5 (15–16); occipitonasal length 29.1 (28.9–29.3), 28.2 (28.2); length of palate 12.95 (12.8–13.1), 12.5 (12.3–12.7); length of palatal foramina 5.5 (5.4–5.6), 5.2 (5.1–5.3); length of auditory bulla 8.85 (8.8–8.9), 8.75 (8.7–8.8); crown length of upper molar series 3.85 (3.8–3.9), 3.85 (3.8–3.9); least interorbital width 5.9 (5.8–6.0), 5.75 (5.7–5.8).

Remarks.—*Gerbillus gerbillus andersoni* may be distinguished from what is here considered the nominate race from 5 miles northwest of the Pyramids of Giza by darker dorsal color and longer more pigmented ear. Cranially it may be distinguished by longer rostrum, larger teeth, more inflated auditory bullae, longer, narrower braincase, longer incisive foramina, and more robust zygomata.

GERBILLUS GERBILLUS GERBILLUS (Olivier)

Dipus gerbillus OLIVIER, Bull. Sci. Soc. Philom. Paris, vol. 2, p. 121, 1801 (Giza Province, Egypt).

Specimens examined.—Thirty-seven. Giza Province: Abu Rauwash, 1 (MVZ); 5 miles east of Helipolis, 4; 8 miles east of Helipolis, 8; 5 miles northwest of Pyramids of Giza, 10; Saqqara, 2. Suez Canal Zone: 3 miles northwest of Fayid, 12.

Description.—Upper parts Pinkish Cinnamon, hairs plumbeous at base, subterminal band of above color, minute terminal band of some hairs blackish. Color purest on sides, flanks, cheeks, and nose; entire underparts, muzzle, most of the vibrissae, hind and fore legs, dorsal and ventral surfaces of hind and fore feet, supraorbital and postauricular spots, white. Ears flesh-colored, nearly naked. Eye bordered by narrow black ring.

Measurements.—Averages and extremes of four males and six females from five miles northwest of the Pyramids of Giza were: Total length 222 (216–227), 211 (203–217); length of tail 127 (123–131), 120 (113–128); length of hind foot 30 (29–31), 28.5 (28–29); length of ear from notch 12 (12), 12 (12); occipitonasal length 27.3 (27.2–27.4), 26.6 (26.2–26.8); length of palate 12.2 (12.1–12.5), 12.1 (11.7–12.5); length of palatal foramina 4.5 (4.3–4.6), 4.4 (4.3–4.6); length of auditory bulla 8.7 (8.5–8.8), 8.4 (8.3–8.8); crown length of upper molar series 3.45 (3.4–3.5), 3.5 (3.4–3.6); least interorbital width 5.85 (5.8–5.9), 5.7 (5.4–6.0); weight 21 (19–22), 19 (18–21).

Remarks.—This small gerbil, represented by 37 specimens, is remarkably constant in measurement and color. In external measurements it is about the same as *Gerbillus gerbillus andersoni*. The two

subspecies can, however, be readily distinguished by their coloration and the longer darker ear and by the noticeably larger skull of *G. g. gerbillus*.

GERBILLUS HENLEYI MARIAE (Bonhote)

Dipodillus mariae BONHOTE, Proc. Zool. Soc. London, 1909, p. 792, April 8, 1910 (Mokkattam Hills, near Cairo, Egypt).

Specimen examined.—One. Giza Province: 5 miles east of Heliopolis.

Description.—Upper parts Pinkish Cinnamon, but little pure color on sides, all pigmented areas strongly suffused with black; hairs of upper parts plumbeous at base; entire underparts, muzzle, fore and hind legs, upper surface of feet, supraorbital and postauricular spots, and narrow ring at base of tail, white; eye and pinnae of ears bordered by narrow black line; ears light brownish, finely covered with whitish hairs; tail long, bicolored (same as back on dorsal surface proximally, grading to blackish distally), penicillate; soles of hands and feet naked.

Measurements.—A male from 5 miles east of Heliopolis measured: Total length 172; length of tail 98; length of hind foot 21; length of ear from notch 9; occipitonasal length 21.3; length of palate 9.0; length of palatal foramina 3.8; length of auditory bulla 7.5; crown length of upper molar series 2.7; least interorbital width 3.8; weight 10.

GERBILLUS NANUS GARAMANTIS Lataste

Gerbillus garamantis LATASTE, Le Naturaliste, 1881, p. 507 (Sidi-Roueld, Ouargla, Algeria. Female, B. M. No. 19.7.7.1596, and its skull, B. M. No. 19.7.7.1597).

Specimens examined.—Three. Giza Province: 1 mile northeast of Kom Aushim.

Description.—Upper parts Clay Color, purest on sides and cheeks; with a strong admixture of black on the back; hairs plumbeous at base in all pigmented hairs; underparts, forelimbs, dorsal surfaces of fore and hind feet, ventral half of tail, supraorbital and postauricular spots and muzzle, white. Ears brownish, nearly naked, bordered by thin blackish line; dorsal surface of nose, blackish; eye bordered by narrow black line; dorsal surface of tail as back color but with more admixture of black, which increases toward the black penicillate tip. Soles of hands and feet naked.

Measurements.—Averages and extremes of three males from 1 mile northeast of Kom Aushim, were: Total length 195.3 (191–202); length of tail 110 (106–115); length of hind foot 23 (22–24); length of ear from notch 12.3 (12–13); occipitonasal length 25.0 (24.2–25.8); length of palate 11.2 (10.6–11.7); length of palatal foramina 4.5 (4.3–4.7); length of auditory bulla 7.9 (7.7–8.2); crown length of upper molar

series 3.43 (3.4–3.5); least interorbital width 4.6 (4.5–4.9); weight 19 (16–22).

Remarks.—It seems hardly logical that this gerbil, in view of the apparent plasticity of the genus, could be the same subspecies in the Nile Valley and in Algeria. However, owing to the lack of comparative material, it is felt best to place the above specimens in this subspecies.

GERBILLUS PYRAMIDUM PYRAMIDUM (E. Geoffroy St.-Hilaire)

Dipus pyramidum E. GEOFFROY ST.-HILAIRE, Catalogue des mammifères du Muséum National d'Histoire Naturelle, p. 202, 1803 (near Pyramids of Giza, Giza Province, Egypt).

Specimens examined.—Twenty-three. Fayum Province: 1 mile northeast of Kom Aushim, 4; Sennuris, 3 (MVZ); The Fayum, 2 (MVZ). Giza Province: Abassia Fever Hospital, Cairo, 2; 3 miles northeast of Mount Abu Rauwash, 5; 1 mile northeast of Mount Abu Rauwash, 3. Nubia: Abu Simbel, 1 (MVZ); Amanda, near El Derr, 3 (MVZ).

Description.—Upper parts Pinkish-Cinnamon, purest on sides, flanks, cheeks and muzzle; hairs of the dorsum plumbeous at base, finely tipped with black, remainder of hairs of body white at base; entire underparts, dorsal and ventral surfaces of fore and hind feet, supraorbital and postauricular spots, lower half of cheeks and muzzle, and posterior ventral half of tail, pure white; tail above, same pure color as on sides, shading in the posterior one-fourth to a penicillate black tip; ears finely covered with hair, margins of pinnae blackish; narrow black ring around eye. Tail not quite so long as head and body; hind feet relatively short.

Measurements.—Two males from 1 mile northeast of Abu Rauwash and two females from 3 miles northeast of Mt. Abu Rauwash measured, respectively: Total length 232, 255; 229, 252; length of tail 128, 135; 129, 139; length of hind foot 34, 35; 33, 33; length of ear from notch 15, 15; 15, 15; occipitonasal length 31.5, 33.0; 29.9, 32.1; length of palate 14.5, 15.0; 13.8, 14.5; length of palatal foramina 5.9, 6.0; 5.3, 6.1; length of auditory bulla 9.0, 9.7; 9.1, 10.0; crown length of upper molar series 4.3, 4.3; 4.2, 4.2; least interorbital width 6.6, 7.2; 6.5, 6.8; weight 37, 56; 32, 42.

Remarks.—In the series of specimens available at this time are what appear to be two color phases. However, when these animals are examined critically, these "phases" are seen to be juvenile and adult pelages. The juvenile pelage is darker than that of the adult and appears to be retained longer than in most species of rodents. With respect to pelage these darker animals appear to fit the description of *Gerbillus pyramidum tarabuli*, and it is possible that this subspecies is based on immature specimens of *G. p. pyramidum*. However, until

such time as a concerted effort is made to obtain specimens and to study this genus throughout its range, all of the animals cited above are here referred to *Gerbillus pyramidum pyramidum*.

PACHYUROMYS DUPRASI NATRONENSIS De Winton

Pachyuromys dupresi (sic) *natronensis* DE WINTON, Nov. Zool., vol. 10, p. 285, August 25, 1903 (Bir Victoria, on the way to Wadi Natron from the Nile Valley, Egypt).

Specimens examined.—Two. Giza Province: West of Abu Rauwash, Cairo area, 1 (MVZ). Egypt: Presumably near Cairo, 1.

Description.—Upper parts Pinkish-Cinnamon, individual hairs plumbeous at base and finely tipped with black; color purest on sides, flanks, cheeks and top of muzzle; hairs of cheeks and muzzle, where pigmented, white at base; entire underparts, lower half of cheeks, thighs, dorsal surfaces of hands and feet, tips of ears, and supra-orbital spots, white; all unpigmented hairs white to base; tail finely covered with white hairs. Tail short and heavy, becoming expanded more or less club-shaped distally and in dry specimens flattened dorso-ventrally; hind feet small; ears rather large.

Measurements.—An adult female, labeled only Egypt but presumably from near Cairo, measured: Total length 165; length of tail 55; length of hind foot 24; occipitonasal length 35.3; length of palate 15.8; length of palatal foramina 6.4; length of bulla 16.5; crown length of upper molar series 4.4; least interorbital width 6.3.

Remarks.—This animal superficially resembles *Meriones libycus* but may be readily distinguished from that species by the short, club-shaped, fatty tail and by a greater extension of the nasals and much larger, more inflated bullae.

The immature animal lacks the bright color of the adult and appears instead much darker, owing to the greater amount of basal plumbeous and black tipping of the hairs. In the immature skull, the general conformation is the same but minor changes occur as adulthood is reached. The space between the mastoid portions of the auditory bullae is greater in the immature, no supraorbital ridge is developed, the nasals appear to encroach more into the frontals, the interparietal becomes slightly smaller and the wings of the supraoccipital become more defined as the animal ages.

MERIONES LIBYCUS LIBYCUS Lichtenstein

Meriones libycus LICHTENSTEIN, Verzeich. Doubl. Zool. Mus. Berlin, 1823, p. 5, No. 9. (Type locality given by Ellerman (1947, p. 485) as near Alexandria, Egypt.)

Specimens examined.—Thirteen. Giza Province: Suez Road, 8 miles east of Heliopolis, 1; Suez Road, 5 miles east of Heliopolis, 10. Suez Canal Zone: 3 miles northwest of Fayid, 2.

Description.—Animals from near Heliopolis have the upper parts Warm Buff with a moderate admixture of black; color purest on sides, flanks and cheeks; entire ventral surface, dorsal and ventral surfaces of hands and feet, muzzle, postorbital and postauricular spots, white; tail above as color of back, shading to a black penicillate tip; purer color on ventral half of tail. All pigmented hairs plumbeous at base. Eye bordered by narrow black ring. Ears light brownish, finely covered with white hairs inside and out. Part of vibrissae white, part black.

Measurements.—Averages and extremes of three males and seven females from five miles east of Heliopolis, were, respectively: Total length 265.3 (256–274), 242 (226–261); length of tail 126.3 (123–132), 120.0 (108–132); length of hind foot 33.3 (33–34), 31.5 (30–33); ear from notch 18 (17–19), 16 (11–18); occipitonasal length 39.2 (38.6–39.7), 35.9 (34.3–37.6); length of palate 16.7 (16.4–17.1), 16.1 (15.5–16.9); length of palatal foramina 6.6 (6.5–6.7), 6.3 (5.6–6.6); length of auditory bulla 14.8 (14.5–15.6), 13.9 (13.1–14.7); crown length of upper molar series 4.7 (4.6–5.1), 4.5 (4.4–4.7); least inter-orbital width 6.0 (5.5–6.4), 5.9 (5.4–6.3); weight 85.6 (77–100), 59.0 (50–71).

Remarks.—Ellerman, in March 1941 (p. 533), places the species *Meriones shawii* as a pure synonym of *Meriones libycus libycus*, and on the same page (533) places *Meriones crassus* as a subspecies of *M. libycus*. In May 1947 he elevated *M. crassus* to full specific rank and removed *M. shawii* from synonymy, making it a subspecies of *M. libycus*. In raising *M. crassus* to full specific rank, he considered that nine subspecies properly belonged to this former subspecies. The subspecies he placed under *M. crassus* belonged to the species *M. libycus*, *M. schouesboei*, *M. erythrourus*, *M. ismahelis* and *M. arimalius*. In October 1947 Ellerman and Chaworth-Musters listed eight subspecies of *M. libycus*, nine of *M. crassus*, and placed *M. shawii* as a full species with three subspecies. In none of the papers cited above do Ellerman, or his coauthor, Chaworth-Musters, give any reason for suppressing or resurrecting species or subspecies.

In "A Revision of the Genus *Meriones*," Chaworth-Musters and Ellerman (1947) cite as key characters: Hind claws dark, *M. libycus*, and hind claws pale, *M. crassus*. In addition to the claw character he gives the joined or closely approximated processes around the supra-meatal triangle as a character distinguishing *M. libycus*. In *M. crassus* the processes are not supposed to be closed or closely approximating. In specimen U.S.N.M. No. 282509 one hind foot has dark-colored and the other hind foot has pale-colored claws. Several other specimens in the series show a similar condition but not quite so pro-

nounced. The processes around the suprameatal triangle are also variable. In U.S.N.M. Nos. 282509 and 282512, as examples, one side shows the processes closed or nearly approximating, while the other side is open and not closely approximated.

From this and from the indecision in placing species, it thus appears that the degree of variation being dealt with is certainly not on a specific but rather on a subspecific level.

PSAMMOMYS OBESUS NICOLLI Thomas

Psammomys obesus nicolli THOMAS, Ann. Mag. Nat. Hist., ser. 8, vol. 2, p. 92, July 1908 (Damietta, northern Egypt).

Specimens examined.—Two. Damietta.

Description.—Upper parts Mikado Brown, strongly suffused with black; color purest on top of head, rump and on the shoulders; dark dorsal color shading over sides into the lighter Clay Color tipped hairs of the underparts; all hairs of the body plumbeous at base; dorsal surfaces of hands and feet yellowish white; narrow dorsal stripe of tail brownish black, expanding distally to form a brush; underside of tail as pure color of the dorsum; vibrissae mixed black and white; cheeks grayish. Tail shorter than head and body; ears short and rounded, sparsely covered with whitish hairs inside and out; forefeet small, four-toed but vestige of thumb remaining as stout claw. Skull resembling that of *Meriones*, except upper incisors are not grooved; supraorbital ridges pronounced.

Measurements.—No external measurements were available; a subadult male skull from Damietta measured: Length of palate 17.3; length of palatal foramina 5.6; crown length of upper molar series 5.5; least interorbital width 6.5; length of nasals 13.7.

Remarks.—In the absence of comparative material and since these specimens are topotypical they are here referred to *Psammomys obesus nicolli*.

PSAMMOMYS OBESUS OBESUS Cretzschmar

This subspecies of sand rat is known from the Alexandria area and may be distinguished from *P. o. nicolli*, from Damietta, solely on the basis of its lighter color. No specimens have been examined.

Family SPALACIDAE

SPALAX AEGYPTIACUS Nehring

The mole rat is apparently only locally distributed in the region around Mariut and Ramleh near Alexandria. Its presence may be ascertained by small mounds of earth thrown out of its burrow system in much the same manner as the pocket gopher of North America.

Even though these animals show no extenal eye, there is supposed to be a minute, completely organized eye present under the skin. No specimens have been examined.

Family MURIDAE

ARVICANTHIS NILOTICUS (Desmarest)

Arvicola niloticus DESMAREST, Mammalogie . . . , pt. 2, p. 281, 1822 (Egypt).

Specimens examined.—Two. Behera Province: Alexandria, 1
Fayum Province: Lake Fayum, 1.

Description.—Dorsal hairs tipped with Ochraceous-Tawny, bases and other hairs of the dorsum throughout their length, blackish; strong admixture of blackish hairs on dorsum, becoming fewer on sides and rump; nose, ring around eyes and hairs of rump Buckthorn Brown; tail bicolored, blackish on dorsal surface, but sparsely haired; ears rather large, rounded and but finely covered with hair; hairs of belly, ventral surfaces of fore and hind legs white-tipped, these hairs with blackish bases; immature pelage darker. Tail about equal to head and body in length; hind feet rather long; thumb expressed as a rudimentary claw only.

Measurements.—One adult male from Lake Fayum, Fayum Province, measured: Total length 321; length of tail 141; length of hind foot 38; length of ear from notch 20; length of palate 16.9; length of palatal foramina 8.5; crown length of upper molar series 6.5; length of nasals 14.6; least interorbital width 5.4; weight 56.0.

Remarks.—On superficial examination these animals are surprisingly like the North American Cricetine genus *Sigmodon*, both externally and cranially. From recorded habitat observations they both occupy much the same ecological niche.

RATTUS NORVEGICUS (Berkenhout)

Mus norvegicus BERKENHOUT, Outlines of the natural history of Great Britain, vol. 1, p. 5, 1769.

Specimens examined.—Twenty-eight. Behera Province: Alexandria, 7. Suez Canal Zone: Port Said, 6; Ismaila, 8; Suez, 7.

Description.—Upper parts near Verona Brown, no pure color, all hairs on back black tipped and plumbeous based, with the intermediate area of the above color; sides, flanks and shoulders somewhat lighter than dorsal color; throat, underside of forelimbs, entire belly and dorsal surfaces of hands and feet, white; hairs of belly and throat, plumbeous based; tail blackish, but sparsely covered with short whitish hairs, annulations distinct. Ears small; tail equal to or somewhat less than head and body; eyes small. Skull: Temporal ridges parallel or nearly so posteriorly; anterior molar with small accessory cusp on anterior edge.

Measurements.—Averages and extremes of five males and two females from Alexandria, Behera Province, were, respectively: Total length 398 (370–428), 415 (415); length of tail 195.4 (182–207), 196.5 (194–199); length of hind foot 42 (40–46), 40 (39–41); length of ear from notch 19.6 (19–20), 19 (19); greatest length of skull 46.4 (44.5–49.5), 27.2 (47.0–47.4); condylobasal length 41.1 (39.3–43.9), 41.8 (41.5–42.1); length of palate 22.3 (21.5–24.2), 22.2 (21.9–22.6); length of palatal foramina 7.9 (7.4–8.4), 7.85 (7.7–8.0); alveolar length of upper molar series 7.5 (7.4–7.6), 7.4 (7.3–7.5); least interorbital width 6.6 (6.4–7.0), 7.0 (6.9–7.1); length of nasals 17.2 (15.8–19.3), 17.75 (17.5–18.0); greatest zygomatic width 22.7 (21.0–25.4), 22.85 (22.8–22.9).

Remarks.—As may be noted from the measurements, these rats show a great amount of age variation. No effort was made to segregate senile from subadult individuals for the purposes of measurement. It is interesting to note that the averages of individuals from the four areas represented are quite close to one another. There are no observable peculiarities in these introduced rats.

RATTUS RATTUS (Linnaeus)

Mus rattus LINNAEUS, *Systema naturae*, ed. 10, p. 61, 1758 (Sweden).

Specimens examined.—Thirty-four. Behera Province: Alexandria, 11. Daqahlia Province: 5 miles west of Simbillawein, 4. Giza Province: Cairo, 11; Kafr Taharnes, 2; Talbia, 4. Suez Canal Zone: Fayid, 2.

Description.—Three basic color types of this species occur in the Delta region. They are: (1) Blackish brown upper parts, with plumbeous belly and hands and feet; (2) grizzled brown upper parts with buff-tipped plumbeous-based hairs on the belly and brownish hands and feet, the toes of both hands and feet whitish; (3) dorsal color as in (2) but somewhat lighter, with underparts white, washed with yellowish, the hands and feet whitish. Tail longer than head and body, but finely covered with hair; annulations pronounced; ears large and rounded. Temporal ridges of skull more or less in the form of a lyre, never parallel as in *R. norvegicus*; anterior upper molar without accessory cusp.

Measurements.—Averages and extremes of eight males and nine females, all of the third color type, from several localities were, respectively: Total length 412 (378–432), 406 (355–460); length of tail 227.5 (208–249), 224.2 (194–262); length of hind foot 36.5 (34–38), 35.6 (33–37); length of ear from notch 23.5 (21–25), 24.8 (24–26); greatest length of skull 42.3 (40.6–44.3), 42.7 (39.6–46.6); condylobasal length 36.9 (35.0–37.8), 36.7 (33.4–40.7); length of palate 19.6 (18.6–

20.0), 19.6 (18.1–21.4); length of anterior palatal foramina 7.4 (6.8–8.3), 7.6 (7.0–8.3); alveolar length of upper molar series 6.8 (6.3–7.2), 6.9 (6.5–7.8); least interorbital width 6.1 (5.8–6.3), 6.1 (5.6–6.6); length of nasals 14.9 (13.5–15.8), 15.2 (13.3–17.0).

Remarks.—If one were to recognize subspecies of the commensal rat then the three color types mentioned under description would become (1) *Rattus rattus rattus*, (2) *Rattus rattus alexandrinus* (which may be considered topotypical), and (3) *Rattus rattus frugivorous*. However, since the three basic color types do not appear to segregate out in any given series from any given locality as just these three color types, but show in six of thirty-four specimens intermediate conditions between any two of the three, it is felt that here, as in *Acomys*, is an expression of some genetic factor, called by some a single gene character for melanism. Certainly, one of the criteria for subspecies is a free interbreeding between two or more contiguous kinds which would be expected to produce intermediate types. It is extremely hard, though, to visualize three distinct subspecies occupying the same environmental niche. Flower (1932, p. 409) and many others mention the fact that no habitat differences could be ascertained between the so-called three subspecies. It may be that if these animals were to be found ferally, one or the other of the three types would segregate and be completely recognizable. It is worthy of mention, though, that the four wild-caught animals from 5 miles west of Simbillawein show all three color types plus one that is intermediate between types two and three.

It is felt that, since there appears to be no segregation, so far as is known, it is best to ignore the subspecific names for the three above-mentioned rats until such time as these names can be shown to be valid.

MUS MUSCULUS Linnaeus

Mus musculus LINNAEUS, *Systema naturae*, ed. 10, p. 62, 1758 (Upsala, Sweden).

Specimens examined.—Eighteen. Behera Province: Alexandria, 6; ½ mile west of Dikheila Airfield, 1; Heliopolis, 1; Maadi, 1. Daqahlia Province: 5 miles west of Simbillawein, 3. Giza Province: Kafr Taharmes, 1; Kuniessa, 1; Talbia, 1. Suez Canal Zone: Port Said, 1; Suez, 2.

Description.—Three color phases are present in the small series from Egypt. They are: (1) Pallid Neutral Gray rather strongly intermixed with black; (2) Cinnamon-Brown without so much black intermixed; and (3) Mummy Brown, strongly suffused with black. In all color phases the hands and feet are white; the bellies in the first two phases are white; in the first the hairs are white to the bases, in the second the hairs are plumbeous at the base; in the third phase the belly is buffy, with the hairs plumbeous at the base. In all three

phases the tail is more or less bicolored and the dark dorsal stripe corresponds to the back color. In the first phase, the ears are pale, resembling the dorsal color; in the second and third phases the ears are dark, as is the dorsal color. The skulls show no one feature that might tend to segregate any of the above color phases as subspecies. They are all regarded as *Mus musculus*.

Measurements.—Averages and extremes of two males and four females from Alexandria, Behera Province, were respectively: Total length 157 (156–158), 166.2 (157–173); length of tail 78 (78), 78.7 (74–82); length of hind foot 17 (17), 17.3 (17–18); length of ear from notch 13 (13), 13.3 (13–14); greatest length of skull 21.7 (21.2–22.2), 21.7 (21.0–22.4); occipitonasal length 21.2 (20.8–21.6), 21.0 (20.5–21.7); length of palate 10.05 (9.8–10.3), 9.9 (9.6–10.4); length of palatal foramina 5.2 (5.2), 4.7 (4.5–5.0); crown length of upper molar series 3.15 (3.1–3.2), 3.2 (3.0–3.4); length of nasals 7.9 (7.8–8.0), 7.8 (7.5–8.3); least interorbital width 3.55 (3.5–3.6), 3.5 (3.5); greatest zygomatic width 11.05 (11.0–11.1), 10.9 (10.6–11.1).

Remarks.—The names applied to the house mice of the Delta region appear to be in as much confusion as are the names applied to *Acomys* and to *Rattus*. It is not thought wise to try to solve the nomenclatural mix-up on so few specimens. The material available is extremely heterogeneous and shows all the types that have been recognized from the Nile Delta and southward.

Mus musculus gentilis, which occurs in a feral condition farther south along the Nile, appears to be the name most applicable to the largest numbers of animals from the Alexandria-Cairo-Suez area. There are, however, individuals that would appear to belong to the north European stock of *Mus musculus musculus* and *Mus musculus domesticus*. In addition, there are specimens of a light color phase from Alexandria that do not correspond to any of the named kinds of *Mus musculus* supposed to be in this area. Cranially, all the specimens examined appear to be of one subspecies.

It is thought best, at this time, merely to refer the house mice of northern Egypt to the species *Mus musculus*.

ACOMYS CAHIRINUS (E. Geoffroy St.-Hilaire)

Mus cahirinus E. GEOFFROY ST.-HILAIRE, Catalogue des mammifères du Muséum National d'Histoire Naturelle, p. 195, 1803 (Cairo, Egypt).

Specimens examined.—Thirty. Behera Province: Alexandria, 8. Daqahlia Province: 5 miles west of Simbillawein, 1. Giza Province: Cairo, Abassia Fever Hospital, 5; Abu Rauwash, 2 (MVZ); Cairo, 4; Kafr Taharmes, 1; Saket Meki, 2. Suez Canal Zone: Suez, 6. Nubia: Abu Simbel, 1 (MVZ).

Description.—Upper parts from between Ochraceous-Orange and Ochraceous-Tawny to deep slate gray; belly yellowish to light slate gray. Color on body nowhere pure; in light phase strongly suffused with black-tipped hairs; in dark phase uniformly slaty. Hands, feet and tail of both color phases as belly color. Tail equal to head and body in length, strongly annulated and with small bristlelike hairs. Pelage coarse but becoming spinose between the ears and spines increasing in size and number over the rump. Ears large, rounded, and but sparsely covered with fine yellowish hairs.

Measurements.—Averages and extremes of two males and six females from Alexandria, Behera Province, Egypt, were, respectively: Total length 209.5 (198–221), 218.6 (208–225); length of tail 113.6 (108–121), 106.6 (97–112); length of hind foot 19 (18–20), 18 (18); length of ear from notch 18.5 (17–20), 18 (17–20); greatest length of skull 28.05 (27.0–29.1), 28.28 (27.9–28.9); condylobasal length 23.85 (22.7–25.0), 24.0 (23.4–24.8); length of palate 14.55 (13.5–15.6), 14.32 (13.7–15.0); alveolar length of upper molar series 4.3 (4.2–4.4), 4.4 (4.4); length of palatal foramina 6.3 (6.2–6.4), 6.2 (5.8–6.6); least interorbital width 4.8 (4.8), 4.7 (4.6–4.8); length of nasals 10.3 (9.9–10.7), 10.6 (10.2–11.1).

Remarks.—These small spiny mice have, at various times, been designated by various specific or subspecific names. Most of these names have, apparently, been based on differences in color. From the specimens now at hand, it appears that the only name strictly applicable is *Acomys cahirinus*. E. Geoffroy St.-Hilaire evidently had before him a specimen of the light-colored phase when he described this animal, and subsequent authors must have had representatives of the other more melanistic types. In all, the two basic types of pelage color are light above and light below and dark above and dark below. From these two phases all possible gradations can be demonstrated by specimens from Abassia Fever Hospital, in Cairo, or from Alexandria.

From all appearances this peculiarity of color is nothing more than the expression of melanism. In many ways these small mice recall the variation of pelage found in *Rattus rattus* and considered by many to be subspecies.

Family DIPODIDAE

JACULUS JACULUS JACULUS (Linnaeus)

Mus jaculus LINNAEUS, *Systema naturae*, ed. 10, p. 63, 1758 (type locality given by Linnaeus as "In Arabia, Calmukia," emended by Allen (1939, p. 423) as Pyramids of Giza).

Specimens examined.—Twenty-two. Giza Province: Abu Rauwash, 5 (MVZ); Suez Road, 5 miles east of Heliopolis, 4; 1 mile north-

east of Kom Aushim, 1; Alexandria Road, 5 miles northwest of Pyramids of Giza, 6. Suez Canal Zone: 3 miles northwest of Fayid, 6.

Description.—Upper parts between Vinaceous-Cinnamon and Pinkish-Cinnamon; hairs plumbeous at base, grading into above color and finely tipped with black; sides and flanks with hairs white to base with a slight admixture of the above colors; entire ventral surface, anterior and ventral surface of thighs, forelegs, hip stripe, postauricular and postorbital spots, muzzle, cheeks, tip and ventral half of tail, white. Ears about as dorsal coloration, sparsely covered with fine white hairs. Eye bordered by narrow black ring. Tail above, for proximal two-thirds, as dorsal color; other one-third divided subequally by proximal black ring, incomplete ventrally, and a distal white tip.

Measurements.—Averages and extremes of two males and four females from 5 miles northwest of the Pyramids of Giza were, respectively: Total length 293 (292–294), 294.5 (284–301); length of tail 179 (176–182), 182 (176–188); length of hind foot 62 (60–64), 61.7 (60–65); length of ear from notch 19 (19), 19.2 (19–20); occipitonasal length 30.0 (30.0), 30.2 (29.6–30.7); greatest length of skull 33.1 (33.1), 33.1 (32.6–33.9); length of nasals 10.65 (10.4–10.9), 10.9 (10.4–11.4); least interorbital width 11.9 (11.8–12.0), 12.1 (11.5–12.7); length of palate 15.6 (15.6), 15.6 (15.2–15.9); length of palatal foramina 4.35 (4.3–4.4), 4.25 (4.2–4.3); length of bulla 14.0 (14.0), 13.8 (13.5–14.2); width of skull across bullae 22.6 (22.6), 21.3 (21.1–21.5); width across maxillary arches 22.5 (22.3–22.7), 22.0 (21.3–22.5); crown length of upper molar series 4.5 (4.4–4.6), 4.75 (4.7–4.8); weight 50.0 (48.0–52.0), 53.0 (51.0–56.0).

Remarks.—If the animals from 5 miles northwest of the Pyramids of Giza are considered topotypical, a slight difference is noted in the size of the crania and the length of the hind foot from those animals from 3 miles northwest of Fayid and 5 miles east of Heliopolis. The pelage in the animals from the latter two localities has less reddish and more black admixture, thus presenting a somewhat darker tone.

Order CARNIVORA

Family CANIDAE

CANIS LUPASTER Hemprich and Ehrenberg

Apparently the jackal is not uncommon. The status of the name applied to the jackal of this region is in some doubt. It can be distinguished from the domestic dog by its shorter muzzle, wider face, and brighter coloration. No specimens have been examined.

VULPES VULPES NILOTICA (E. Geoffroy St.-Hilaire)

Canis niloticus E. GEOFFROY ST.-HILAIRE, Catalogue des mammifères du Muséum National d'Histoire Naturelle, p. 134, 1803 (Egypt).

Vulpes vulpes aegyptiaca, ANDERSON and DE WINTON, Zoology of Egypt, Mammalia . . ., p. 227, pl. 32, 1902 (Egypt).

Specimen examined.—One. Daqahlia Province: 5 miles west of Simbillawein.

Description.—Dorsal stripe, beginning between shoulders and continuing onto dorsal one-fourth of tail, Sanford's Brown, strongly intermixed with black hairs; all except black hairs with a subapical band of yellowish white and wide basal band of plumbeous; Sanford's Brown purest on cheeks, around eyes, inside and back of fore limbs and back of hind limbs; throat, chest, and belly to peneal region smoky gray with some admixture of whitish hairs; inside of ears, lower part of cheeks and continuing toward and beyond angle of jaws, lateral and ventral surfaces of base and distal half of tail, white; white hairs of distal half of tail sparsely tipped with black; sides, shoulders, and flanks, grayish; areas on side of neck, behind shoulder and groin, yellowish white; anterior face of foreleg with blackish brown, white and black longitudinal stripes; anterior face of thigh and continuing onto dorsal surface of hind foot with yellowish-white stripe; posterior dorsal one-half of ears black.

Measurements.—An adult male from 5 miles west of Simbillawein measured: Total length 1,052; length of tail 416; length of hind foot 157; length of ear from notch 101; greatest length of skull 149.6; occipitonasal length 130.3; condylobasal length 136.2; length of palate 73.1; width across M¹ 40.7; greatest width of braincase 46.3; least interorbital width (behind supraorbital processes) 20.0; length of nasals 40.5; width of rostrum 25.1.

Family MUSTELIDAE

MUSTELA NIVALIS SUBPALMATA Hemprich and Ehrenberg

Mustelae subpalmatae HEMPRICH and EHRENBURG, Symbolae physicae . . ., dec. 2, folio k, p. 2, September 1832 (in houses of Cairo and Alexandria, Egypt).

Specimens examined.—Six. Daqahlia Province: 5 miles west of Simbillawein, 2. Behera Province: Alexandria, 1. Giza Province: Kafr Taharmes, 1; Kuniessa, 1; Saket Meki, 1.

Description.—All dorsal coloration, including hands, feet, ears, and tail all around, between Brussels Brown and Raw Umber; chin, throat, chest, and most of belly, white or a yellowish white; brown of dorsal coloration extending onto belly, sometimes continuous across belly but

more frequently merely spotted; tail with faint suggestion of black tip. Ears and eyes small; tail about half as long as head and body.

Measurements.—An adult male from Kuniessa, Giza Province, and an adult female from 5 miles west of Simbillawein measured, respectively: Total length 381, 330; length of tail 120, 92; length of hind foot 47, 39; length of ear from notch —, 17; basilar length 46.7, 42.1; canine to M³ 13.0, 12.0; breadth of rostrum across lacrimals 13.7, 11.2; least interorbital width 8.5, 7.4; mastoid breadth 25.0, 20.9; zygomatic breadth 27.7, 22.7.

Remarks.—Apparently, in Egypt, this animal is more an inhabitant of houses than it is of the countryside. All the specimens studied were caught in buildings during rat-control programs.

POECILICTIS LIBYCA (Hemprich and Ehrenberg)

Mustela libyca HEMPRICH and EHRENBURG, *Symbolae physicae* . . . , dec. 2, folio k, p. 6, 1832 (Egypt).

Specimen examined.—One. Giza Province: Cairo Area, Abu Rauwash (MVZ).

Description.—Colors of this animal are white and blackish brown. White distributed on the body as small mystacial patches; a narrow white ring occurs between the eyes and ears, then turning ventrad around the point of the jaw and meeting on the bottom of the throat; tip of ears white; base of a more or less lyre-shaped band of white begins in back of the ears and behind the forehead stripe, the band running posteriorly and somewhat lateroventrad to cross the flanks and continue to the base of the tail; inside this large lyre is a smaller lyre-shaped band of white, which becomes closed at the base of the tail; inside the loop of the median lyre is a more or less diamond-shaped patch completely encircled by black and with a small black spot in the center. The outermost lyre-shaped band continues onto the dorsal surface of the tail to the tip and for approximately one-half the ventral surface. The posterior ventral half of the tail has black-tipped white hairs. Entire ventral surface covered with blackish brown hairs. Ears small and rounded; soles of hands and feet, with the exception of the pads, haired; eyes small.

Measurements.—An adult male from Abu Rauwash measured: Total length 388; length of tail 158; length of hind foot 43; condylobasal length 53.6; length of palate 25.1; M¹ to canine 18.1; breadth across P⁴ 18.5; width of zygomatic arches 33.5; width of rostrum 11.4; width of cranial constriction behind postorbital processes 11.5; width across bullae 31.1.

Remarks.—This small mustelid is remarkably like the North American genus *Spilogale* in its markings.

Family VIVERRIDAE

HERPESTES ICHNEUMON (Linnaeus)

Viverra ichneumon LINNAEUS, Systema naturae, ed. 10, p. 43, 1758 (Egypt).

Specimen examined.—One. Daqahlia Province: 5 miles west of Simbillawein.

Description.—Color: Under fur shading from Isabella Color on neck and shoulders to Cinnamon-Rufous on rump, thighs, and base of tail. Guard hairs long (about 65 mm.) and eight-banded, with alternating white and black bands; tips of guard hairs brownish instead of black as rest of bands; face, chin, muzzle, and dorsal surfaces of hands and feet, blackish; palms and soles naked; belly sparsely haired. Entire animal, owing to banded hairs, presents a grizzled appearance. Ears small and rounded; tail not quite so long as head and body, and owing to the banded hairs appears to be ringed; tail more or less tufted at tip.

Measurements.—One male from 5 miles west of Simbillawein measured: Total length 990; length of tail 453; length of hind foot 104; length of ear from notch 37; condylobasal length 104.6; zygomatic width 53.7; postorbital width 17.5; interorbital width 18.5; maxillary width 32.4.

Family FELIDAE

FELIS CHAUS Schreber

This cat is apparently to be found throughout the Delta region, usually in low marshy places. It may be distinguished from the feral *Felis catus* by its shorter tail (less than one-half the head and body length); by its larger, black-tipped ears; and by its reddish feet. It is apparently not uncommon. No specimens have been examined.

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